REMARKS

Claims 1-17, 19-62 are pending in the application. Claims 1-17, 19-62 are rejected. Claims 54 and 55 have been cancelled herein.

The claims have been amended to clarify applicant's invention.

In the Office Action of March 31, 2004 the Examiner notes in item 1.3 that it is not clear how interleaving/de-interleaving can be performed without changing the order of cell data in each row/column.

It is respectfully submitted that by reordering the rows within a matrix it is the rows with are reordered and the individual data pieces within each row are not re-ordered and reordering the columns within a matrix it is the columns with are reordered and the individual data pieces within each column are not re-ordered.

This is described in applicant's specification for example Fig. 25 shows 16 columns of 384 pieces of data. Fig. 26 shows the 16 columns rearranged. It can be seen that the individual data pieces within each column are not re-ordered. For example in Fig. 25 the "2" column with starting data addr. 004 moves to the second column in Fig. 26. It can be seen in Fig. 26 that the individual data pieces within this column are not re-ordered (004, 020, 036,...) (applicant's specification page 59:19-60:15). Similarly the rows are described in applicant's specification page 60:16-61:5.

In addition applicant claims the predetermined order provides that each rearranged row is adjacent to different rows than were adjacent to each row at each row's original position and likewise each rearranged column is adjacent to different columns than were adjacent to each column at each column's original position.

In the Office Action of March 31, 2004 the Examiner notes in item 1.1 that is not clear what is meant by disbursing. This word was used to indicate that the bits in the transmission stream where efficiently redistributed and rearranged to minimize the effect of burst errors.

With regard to item 1.2 of the Office Action applicant hopes to clarify the previous description herein.

Applicant's claimed features and combination of claimed features are not suggested by the references either singly or in combination for at least the following reasons:

REJECTIONS UNDER 35 U.S.C. § 102

Claims 1-17, 19-62 are rejected under 35 U.S.C. § 102(b) as anticipated by Currie et al. (Currie).

Currie et al. teach reordering data bits in columns or rows (col. 2, lines 16-21) or reordering and rotating bits (col. 2, lines 23-24).

Currie describes bit rotation with a column or row as shown in Fig. 5 and described in col. 5, line 37 et seq.

When Currie describes applying permutation to the column rotation (col. 5, starting line 63) it is described that column zero stays in the zero position and column one stays in the one position the bit rotation is then applied (col. 6, lines 6-19).

This system taught by Currie is called dual orthogonal permutation. Currie relies on the bit rotation within a column or row. "By performing dual orthogonal permutation the distribution of the bits within columns or rows more closely approaches a quasi-random distribution that was heretofore performed with prior art row-column interleavers." (col.6, lines 14-19).

Thus Currie et al. is different from applicant's claimed invention because of the bit rotation with the row or column in the "dual orthogonal permutation of Currie.

Applicant claims rearranging the rows without changing the order of the set of data pieces in each row, or rearranging the columns without changing the order of the set of data pieces in each column.

In addition applicant's claims recite the row predetermined order provides for each rearranged row to be adjacent to different rows than were adjacent to each row at each row's original position and the column predetermined order provides for each rearranged column to be adjacent to different columns than were adjacent to each column at each column's original position.

In contrast Currie describes column zero and one remain next to each other and the other columns are not specifically adjacent to other columns (col. 5, line 66 – col. 6, line 6).

For at least the foregoing reasons it is respectfully requested the rejection be withdrawn.

REJECTIONS UNDER 35 U.S.C. § 103

Claims 1-17, 19-62 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' admitted prior art (AAPA) in view of Lin et al.

Claims 1, 2, 3, 10, 17, 19-24, 31, 32, 35, 36, 43, 46 and 49 are rejected under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of Azuma et al., and also as being unpatentable over AAPA in view of "Turbo Code ..." to Yamaguchi et al., and as being unpatentable over AAPA in view of Karasawa et al.

Claims 1, 2, 3, 10, 17, 19, 20, 23, 24, 31, 32, 35, 36, 43, 46 and 49 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Karasawa in view of Yamaguchi

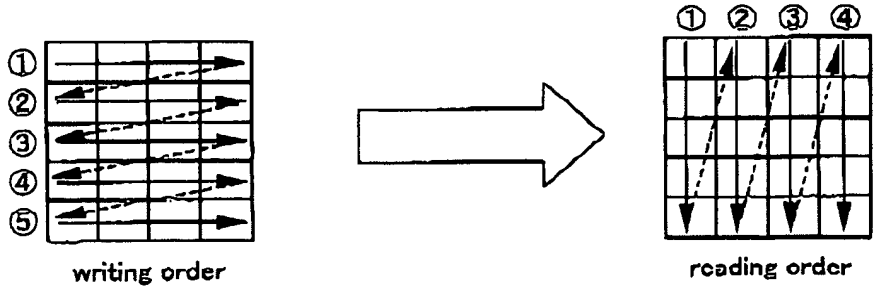
and "Two-Dimensional Interleaving ..." to de Almeida et al., and as being unpatentable over Karasawa in view of Azuma and de Almeida.

Applicant's independent claims disclose a method and apparatus of interleaving and de-interleaving data. The data is rearranged by interchanging rows of the matrix according to a predetermined order, and then by interchanging columns of the matrix according to a predetermined order.

By interleaving at least one of rows and columns thus rearranging the rows or columns without changing the order of the set of data pieces in each row or column, applicant's claimed invention provides an efficient interleaver or de-interleaver.

In the Office Action it's admitted that none of the AAPA describes rearranging data by columns or rows. It is respectfully submitted that applicant is rearranging columns or rows which may be additionally different from rearranging data by column or row.

Lin is pointed to in the first rejection. However Lin teaches Block interleaving which is different from applicant's claimed features. In fact none of the cited references teaches the features recited in applicant's claims as pointed out above with respect to the Currie reference. Therefore it is respectfully submitted that none of the combination of references teaches the claimed features.



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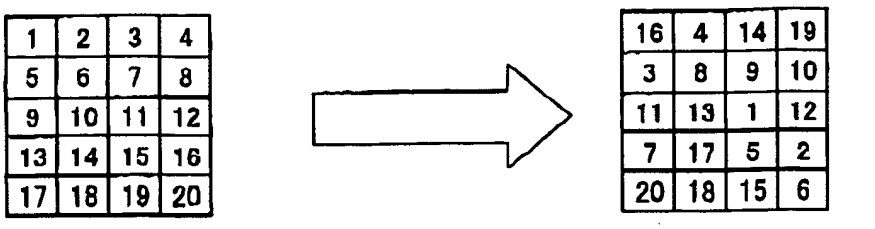
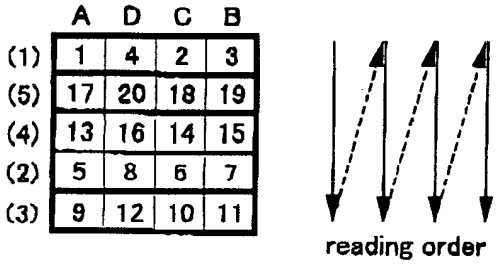
(Corresponds to FIG.22 of Prior Art)



(Corresponds to FIG.23 of Prior Art)

As described with reference to Applicants' Fig. 23, another prior art method randomly reorders cell data in the matrix, and randomly the re-ordered data. A third prior art method described with reference to Applicants' Fig. 24 randomly writes data to cells of the matrix and reads data in row order.



Unlike Applicants claimed apparatus and method, none of AAPA and the cited references suggest or otherwise disclose a method of interleaving/de-interleaving in which rows of a matrix are first reordered without changing the order of cell data in each row, and columns are then reordered without changing the order of cell data in each column, in order to produce cell data that has been effectively disbursed.

The cited references generally disclose interleaving algorithms but none disclose the predetermined order recited in applicant's claims wherein each rearranged row is adjacent to different rows than were adjacent to each row at each row's original position and each rearranged column to be adjacent to different columns than were adjacent to each column at each column's original position.

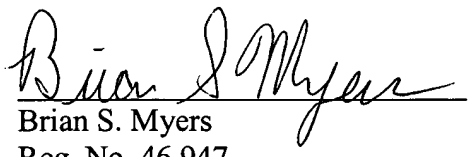
This is not taught by Currie, AAPA, nor any of the cited references.

Applicants' claimed method provides the strong advantage of providing rearranged cell data that is highly resistant to burst errors in a manner that can be implemented by relatively simple circuits and algorithms. Because of applicant's unique combination of features an advantage over the prior art is provided where the complexity and cost of interleaving circuitry and algorithms is substantially reduced over conventional interleaving/de-interleaving methods.

In view of the remarks set forth above, this application is in condition for allowance which action is respectfully requested. However, if for any reason the Examiner should consider this application not to be in condition for allowance, the Examiner is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged to Deposit Account No. 50-1290.

Respectfully submitted,



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